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Appendix H
Biological Resources Tables

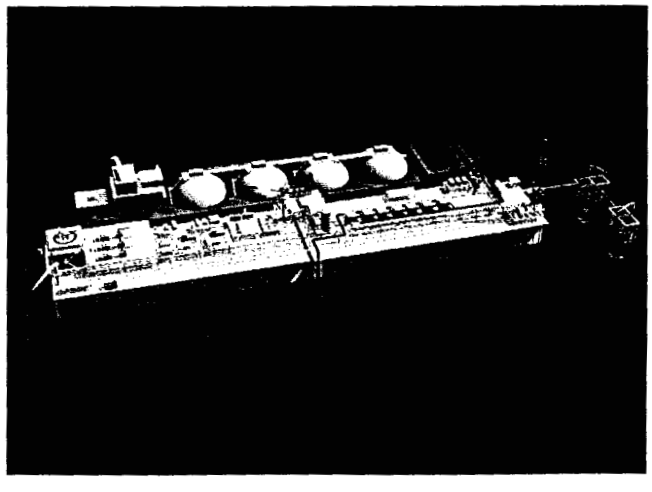

Table H-1. Marine Mammals Present in the GOM

Species	Status	Occurrence	Typical Habitat			Additional Data
			Coastal	Shelf	Slope/Deep	
SUBORDER MYSTICETI (baleen whales)						
Family Balaenidae						
Northern right whale *(Eubalaena glacialis)*	E	1	--	X	X	♦ two right whales observed off New Pass, Sarasota, FL, in 1963
Family Balaenopteridae						
Blue whale *(Balaenoptera musculus)*	E	1	--	X	X	♦ two strandings between Freeport and San Luis, TX, in 1940
Bryde's whale *(Balaenoptera edeni)*	--	3	--	X	X	♦ northeastern Gulf, DeSoto Canyon to western FL ♦ near 328-ft (100-m) isobath
Fin whale *(Balaenoptera physalus)*	E	1	--	X	X	♦ three strandings, seven sightings, likely accidental occurrences
Humpback whale *(Megaptera novaeangliae)*	E	1	--	X	X	♦ various sightings, strandings, and soundings, but likely strays from Caribbean ♦ no resident population in GOM
Minke whale *(Balaenoptera acutorostrata)*	--	2	X	X	X	♦ 10 confirmed strandings (most on eastern GOM beaches), no live sightings ♦ might be strays or winter migrants
Sei whale *(Balaenoptera borealis)*	E	1	--	X	X	♦ only five reliable records, four of which are strandings (three in eastern LA and one on FL panhandle)

Table H-1. Marine Mammals Present in the GOM (continued)

Species	Status	Occurrence	Typical Habitat			Additional Data
			Coastal	Shelf	Slope/Deep	
SUBORDER ODONTOCETI (toothed whales and dolphins)						
Family Physeteridae						
Dwarf sperm whale *(Kogia simus)*	--	3	--	--	X	♦ northern GOM region ♦ shelf edge break/upper slope ♦ 328–6,562 ft (100–2,000 m)
Pygmy sperm whale *(Kogia breviceps)*	--	3	--	--	X	♦ northern GOM region ♦ nearshore and shelf edge break/upper slope 328–6,562 ft (100–2,000 m)
Sperm whale *(Physeter macrocephalus)*	E	4	--	--	X	♦ Mississippi Delta region ♦ between 328–6,562 ft (100–2,000 m) ♦ most concentrated at 3,280 ft (1,000 m)
Family Ziphiidae [1]						
Blainville's beaked whale *(Mesoplodon densirostris)*	--	2[1]	--	--	X	♦distributed in water >3,280 ft (1,000 m) (unidentified ziphiids sighted in GulfCet survey)
Cuvier's beaked whale *(Ziphius cavirostris)*	--	2[1]	--	--	X	♦ distributed in water >3,280 ft (1,000 m) (unidentified ziphiids sighted in GulfCet survey)
Gervais' beaked whale *(Mesoplodon europaeus)*	--	3[1]	--	--	X	♦ distributed in water >3,280 ft (1,000 m) (unidentified ziphiids sighted in GulfCet survey)
Sowerby's beaked whale *(Mesoplodon bidens)*	--	1[1]	--	--	X	♦ one animal stranded alive in Gulf County, FL ♦ distributed in water >3,280 ft (1,000 m) (unidentified ziphiids sighted in GulfCet survey)

Table H-1. Marine Mammals Present in the GOM (continued)

Species	Status	Occurrence	Typical Habitat			Additional Data
			Coastal	Shelf	Slope/Deep	
Family Delphinidae						
Atlantic spotted dolphin *(Stenella frontalis)*	--	4	--	X	X	♦ 66–656 ft (20–200 m) ♦ some records out to 3,280 ft (1,000 m) ♦ concentrated around 328 ft (100 m)
Bottlenose dolphin *(Tursiops truncates)*	--	4	X	X	X	♦ coastal and oceanic populations ♦ depths less than 3,280 ft (1,000 m) ♦ most common species of coastal GOM
Clymene dolphin *(Stenella clymene)*	--	4	--	--	X	♦ central GOM ♦ > 328 ft (100 m)
False killer whale *(Pseudorca crassidens)*	--	3	--	--	X	♦ widely distributed throughout northern GOM ♦ 656–6,562 ft (200–2,000 m)
Fraser's dolphin *(Lagenodelphis hosei)*	--	4	--	--	X	♦ northwestern GOM ♦ water around 3,280 ft (1,000 m)
Killer whale *(Orcinus orca)*	--	3	--	--	X	♦ Mississippi Delta Region 328–6,560 ft (100–2,000 m)
Melon-headed whale *(Peponocephala electra)*	--	4	--	--	X	♦ northwestern Gulf ♦ 656–6,562 ft (200–2,000 m)
Pantropical spotted dolphin (*Stenella attenuate)*	--	4	--	--	X	♦ northern GOM ♦ 328–6,562 ft (100–2,000 m) ♦ most common cetacean in deep GOM waters
Pygmy killer whale (*Feresa attenuate)*	--	3	--	--	X	♦ strandings from FL to south TX ♦ northern GOM ♦ 1,640–3,280 ft (500–1,000 m)
Short-finned pilot whale (*Globicephala macrorhynchus)*	--	4	--	--	X	♦ central and western (northern) GOM ♦ 200–2000 m (656–6,560 ft)
Risso's dolphin (*Grampus griseus)*	--	4	--	--	X	♦ Northern GOM ♦ 150–2,000 m (492–6,560 ft)

Table H-1. Marine Mammals Present in the GOM (continued)

Species	Status	Occurrence	Typical Habitat			Additional Data
			Coastal	Shelf	Slope/Deep	
Rough-toothed dolphin (*Steno bredanensis)*	--	4	--	--	X	♦ northern GOM ♦ south of Mississippi Delta ♦ 656–5,020 ft (200–1,530 ft)
Spinner dolphin (*Stenella longirostris)*	--	4	--	--	X	♦ southeast of Mississippi River ♦ > 328 ft (100 m)
Striped dolphin (*Stenella coeruleoalba)*	--	4	--	--	X	♦ northern GOM ♦ > 200 m (656 ft) ♦ rare in extreme northwest
ORDER SIRENIA (dugongs and manatees)						
Family Trichechidae						
West Indian manatee (*Trichechus manatus)*	E	1	X	--	--	♦ rare except in Florida

Source: Adapted from Würsig et al. 2000
Notes:
Status: E = endangered under the Endangered Species Act of 1973
Occurrence: 1 = extralimital; 2 = rare; 3 = uncommon; 4 = common
[3] Beaked whales in the GOM might be uncommon or common rather than rare or extralimital. Their population status is uncertain because they are difficult to see and identify to species. Most surveys have been conducted in sea states that are not optimal for sighting beaked whales.

Table H-2. Aquatic and Marine Birds That Can Occur in the ROI

Category/Common Name	Scientific Name
Seabirds	
Bonaparte's gull[1]	*Larus philadelphia*
Herring gull[1]	*Larus argentatus*
Kelp gull[2]	*Larus dominicanus*
Laughing gull[3]	*Larus atricilla*
Lesser black-backed gull[1]	*Larus fuscus*
Ring-billed gull[1]	*Larus delawarensis*
Long-tailed jaeger[1]	*Stercorarius longicaudus*
Parasitic jaeger[1]	*Stercorarius parasiticus*
Pomarine jaeger[5]	*Stercorarius pomarinus*
Brown noddy[5]	*Anous stolidus*
Arctic tern[5]	*Sterna paridisaea*
Bridled tern[2]	*Sterna anaethetus*
Caspian tern[2,3]	*Sterna caspia*
Common tern[5]	*Sterna hirundo*
Gull-billed tern[3]	*Sterna nilotica*
Forster's tern[3]	*Sterna forsteri*
Least tern[5]	*Sterna antillarum*
Royal tern[3]	*Sterna maxima*
Sandwich tern[2]	*Sterna sandvicensis*
Sooty tern[2]	*Sterna fuscata*
Audubon's shearwater[2]	*Puffinus iherminieri*
Cory's shearwater[2]	*Calonectris diomedea*
Greater shearwater[2]	*Puffinus gravis*
Manx shearwater[5]	*Puffinus puffinus*
Sooty shearwater[5]	*Puffinus griseus*
Band-rumped storm-petrel[2]	*Oceanodroma castro*
Leach's storm petrel[5]	*Oceanodroma leucorhoa*
Wilson's storm petrel[2]	*Oceanites oceanicus*
American white pelican	*Pelecanus erythrorhynchos*
Brown pelican[4]	*Pelecanus occidentalis*
Shorebirds	
Black-bellied plover[1]	*Pluvilais dominica*
Piping plover[1,4]	*Charadrius melodus*
Semipalmated plover[1]	*Charadrius semipalmatus*
Snowy plover[1]	*Charadrius alexandrinus*
Wilson's plover[2]	*Charadrius wilsonia*
Killdeer[3]	*Charadrius vociferus*
American oystercatcher[3]	*Haematopus palliatus*

Table H-2. Aquatic and Marine Birds That Can Occur in the ROI (continued)

Category/Common Name	Scientific Name
American avocet[1]	*Recurvirostra americana*
Black-necked stilt[3]	*Himantopus mexicanus*
Least sandpiper[1]	*Calidris minutilla*
Spotted sandpiper[1]	*Actitus macularia*
Western sandpiper[1]	*Calidris mauri*
Long-billed dowitcher[1]	*Limnodromus scolopaceus*
American woodcock[1]	*Scolopax minor*
Wilson's snipe[1]	*Gallinago gallinago*
Pin-tailed snipe	*Gallinago stenura*
Willet[3]	*Catoptrophorus semipalmatus*
Greater lesser[3]	*Tringa melanoleuca*
Yellow lesser[1]	*Tringa flavipes*
Marsh and Wading Birds	
American bittern[1]	*Botaurus lentiginosus*
Least bittern[2]	*Lxobrychus exilis*
Black-crowned Night heron[3]	*Nycticorax nycitcorax*
Great Blue heron[3]	*Ardea herodias*
Green heron[3]	*Butorides virescens*
Little Blue heron[3]	*Egreatta caerulea*
Yellow-crowned Night heron[2]	*Nyctanassa violacea*
Tri-colored heron[3]	*Egretta tricolor*
Cattle egret[3]	*Bubulcus ibis*
Great egret[3]	*Ardea alba*
Reddish egret[3]	*Egretta rufescens*
Snowy egret[3]	*Egretta thula*
Anhinga	*Anhinga anhinga*
Pied-billed grebe	*Podilymbus podiceps*
Glossy ibis[3]	*Plegadis falcinellus*
White-faced ibis[3]	*Plegadis chihi*
White ibis[3]	*Eudocimus albus*
Roseate spoonbill[2,3]	*Ajaia ajaja*
King rail[3]	*Rallus elegans*
Clapper rail[3]	*Rallus longirostris*
Virginia rail[1]	*Rallus limicola*
Yellow rail[1]	*Coturnicops noveboracenis*
Purple gallinule[2]	*Porphrula martinica*
Common moorhen[3]	*Gallinula chloropus*
American coot[3]	*Fulica americana*
Sandhill crane[1,3]	*Grus canadensis*

Table H-2. Aquatic and Marine Birds That Can Occur in the ROI (continued)

Category/Common Name	Scientific Name
Waterfowl	
Greater white-fronted goose[1]	*Anser albifrons*
Snow goose[1]	*Chen caerulescens*
Ross's goose[1]	*Chen rossii*
Canada goose[1]	*Branta canadensis*
American wigeon[1]	*Anas americana*
Black-bellied whistling duck[2]	*Dendrocygna autumnalis*
Blue-winged teal[3]	*Anas discors*
Bufflehead[1]	*Bucephala albeola*
Canvasback[1]	*Aythya valisinera*
Common goldeneye[1]	*Bucephala clangula*
Fulvous whistling duck[2]	*Dendrocygna bicolor*
Gadwall[1]	*Anas strepera*
Greater scaup[1]	*Aythya marila*
Green-winged teal[1]	*Anas crecca*
Hooded merganser[1]	*Lophodytes cucullatus*
Lesser scaup[1]	*Aythya affinis*
Mallard[1]	*Anas platyrhychos*
Mottled duck[3]	*Anas fulvigula*
Northern pintail[1]	*Anas acuta*
Northern shoveler[1]	*Anas clypeata*
Red-breasted merganser[1]	*Mergus serrator*
Redhead[1]	*Aythya americana*
Ring-necked duck[1]	*Aythya collaris*
Ruddy duck[1]	*Oxyura jamaicensis*
Wood duck[3]	*Aix sponsa*

Source: NGS 2002

Notes:

[1] Winter range

[2] Breeding range, generally in spring and summer

[3] Year-round range

[4] Endangered Species

[5] Seabirds cited in the GulfCet I Survey

Table H-3. EFH of Federally Managed Fish Species in the ROI

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
BROWN SHRIMP ♦ estuaries (where common, abundant, highly abundant) ♦ offshore areas (adult, spawning, and nursery areas) to depths of 110 m (361 ft), throughout the GOM	♦ demersal ♦ peak in fall and spring ♦ distribution similar to spawning adults ♦ hatch within 24 hours of spawning	♦ larvae-offshore ♦ post-larvae-estuaries from Apalachicola Bay, FL, to Mexican border	♦ estuaries from Apalachicola Bay, FL, to Mexican border ♦ shallow vegetated habitats ♦ silty, non-vegetated mud bottoms ♦ 0–70 ppt, marsh edge ♦ Submerged aquatic vegetation, tidal creeks, inner marsh, shallow open water, oyster reefs	♦ abundance correlates positively with turbidity and negatively with hypoxia ♦ neritic GOM waters ♦ silt, muddy sand, sand substrates ♦ to depths of 110 m	♦ peak in fall and spring ♦ waters deeper than 64 m (210 ft)	♦ eggs ♦ larvae ♦ sub-adults ♦ adults
WHITE SHRIMP ♦ estuaries (where common, abundant, highly abundant) ♦ offshore areas (adult, spawning, and nursery areas) to depths of 40 m (131 ft), in the coastal area extending from Florida's Big Bend area through Texas	♦ demersal ♦ spring to late fall ♦ distribution similar to spawning adults ♦ hatch 10–12 hours after spawning	♦ larvae-planktonic, nearshore ♦ post-larvae-upper 2 m (7 ft) of water column to mid-water depths ♦ benthic in estuaries ♦ shallow water, muddy sand bottom, ♦ estuaries from Suwanee River, FL, to TX	♦ post-larvae-juvenile-muddy peat bottoms, decaying organic vegetative material ♦ juvenile-low salinity waters, tidal creeks estuaries ♦ move to coastal waters as approach maturity	♦ nearshore GOM waters to depths of 30 m (98 ft), Big Bend, FL, to TX ♦ soft mud or silt	♦ spring to late fall, peak in summer ♦ waters 9–34 m (30–112 ft), mostly less than 27 m (89 ft)	♦ eggs ♦ larvae ♦ sub-adults ♦ adults
RED DRUM ♦ estuaries (where common, abundant, highly abundant-nearly all estuaries of GOM) ♦ offshore areas (adult, spawning, and nursery areas) ♦ shallow estuarine waters to depths of 40 m (131 ft)	♦ GOM	♦ estuaries	♦ reach maturity in estuaries	♦ some estuarine waters, mostly offshore	♦ deeper waters, mouths of bays, inlets and GOM side of barrier islands	♦ eggs ♦ larvae ♦ sub-adults ♦ adults

Table H-3. EFH of Federally Managed Fish Species in the ROI (continued)

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
RED SNAPPER ♦ demersal, sandy and rocky bottoms, around reefs and underwater objects ♦ 0–200 m (0–656 ft) and >1,200 m (3,936 ft) ♦ throughout GOM shelf ♦ abundant on Campeche Banks, in northern GOM ♦ particularly abundant on Campeche Banks in the northern GOM ♦ depths of 0–200m (0–656 ft), and possibly beyond 1,200 m (3,917 ft)	♦ offshore, summer and fall	♦ larvae, post-larvae, and early juveniles-shelf waters to depths 17–183 m (56–600 ft) ♦ through Nov in shelf waters ♦ depths of 17–183 m (56–600 ft)	♦ structure, objects or small burrows, barren sand and mud, late ♦ through Nov in shelf waters ♦ depths of 17–183 m (56–600 ft) ♦ associated with structures, objects or small burrows ♦ also found over barren sand and mud bottom ♦ late juveniles taken year round in depths 20–46 m (66–151 ft)	♦ favor deeper waters in Gulf ♦ concentrated off Yucatan, Texas, and Louisiana ♦ depths of 7–146 m (23–479 ft) ♦ most are abundant at depths of 40–110 m (131–361 ft) ♦ commonly occur over submarine gullies and depressions, and over coral reefs, rock outcroppings, and gravel bottoms	♦ offshore from May to Oct ♦ 17–183 m (560–600 ft) ♦ depths 18–37 m (59–121 ft)	♦ all life stages
GRAY SNAPPER ♦ shelf waters of GOM ♦ abundant off south and southwest Florida ♦ all estuaries in GOM ♦ most common in Florida inshore waters out to depths of 180 m (590 ft)	♦ pelagic, June through September ♦ offshore shelf waters ♦ near coral reefs	♦ planktonic ♦ peak-June through August ♦ offshore shelf waters ♦ near coral reefs ♦ FL through TX ♦ post-larvae-move into estuarine habitat, over dense seagrass beds, *Halodule* and *Syringodium*	♦ marine, estuarine, riverine habitats, including channels, bayous, ponds, grassbeds, marshes, mangrove swamps, freshwater creeks, *Thallassia* grass flats, marl bottoms, seagrass meadows, and mangrove roots	♦ demersal and mid-waters, marine, estuarine, and riverine habitat ♦ offshore to 32 km (17 NM) ♦ inshore to coastal plain and freshwater habitat, mangroves, sandy grassbeds, coral reefs, over muddy and rocky bottoms	♦ offshore around reefs and shoals, June to August	♦ eggs ♦ larvae ♦ adults

Table H-3. EFH of Federally Managed Fish Species in the ROI (continued)

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
LANE SNAPPER ♦ throughout shelf areas of GOM ♦ depths 0–130 m (0–426 ft) ♦ demersal ♦ occurs over all bottom types ♦ most common in reef areas and sandy bottoms	♦ present after spawning ● March through September with peak in July and August	♦ no data	♦ mangrove and grassy estuarine areas ♦ southern TX and FL ♦ shallow areas with sandy and muddy bottoms off all GOM states ♦ grass flats, reefs, and soft bottom areas ♦ to depths of 20 m (66 ft)	♦ offshore ♦ depths of 4–132 m (13–433 ft) ♦ sand bottom ♦ natural channels, banks, man-made reefs, and structures	● offshore waters, March-September (peak July-August)	♦ eggs ♦ juveniles ♦ adults
GREATER AMBERJACK ♦ throughout GOM coast to depths of 400 m (1312 ft)	♦ open Gulf ♦ 30–35 ppt	♦ assumed offshore open waters	♦ pelagic ♦ attracted to floating plants and debris ● offshore	♦ pelagic, epibenthic ♦ occurs over reefs and wrecks and around buoys	♦ northern GOM from May to July (may be as early as April) ♦ offshore-year round	♦ all life stages
LESSER AMBERJACK	♦ no data	♦ no data	● offshore, later summer and fall in northern GOM ● associated with oil and gas rigs and irregular bottom	● no data	♦ offshore, September-December, and February through March ♦ associated with oil and gas structures and irregular bottom	♦ all life stages

Table H-3. EFH of Federally Managed Fish Species in the ROI (continued)

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
GRAY TRIGGERFISH	♦ late spring, nests in sand near natural and artificial reefs, guarded by male or female	♦ larvae and post-larvae-pelagic ♦ upper water column	♦ associated with Sargassum and other flotsam ♦ may be found in mangrove estuaries	♦ offshore, waters greater than 10 m (33 ft) ♦ associated with artificial and natural reefs	♦ late spring and summer, waters greater than 10 m ♦ associated with artificial and natural reefs	♦ all life stages
KING MACKEREL ♦ shore to 200 m (65 ft) depths ♦ marine pelagic waters	♦ surface waters, pelagic ♦ 30–180 m (98–590 ft)	♦ water column ♦ marine waters throughout range	♦ use estuaries occasionally	♦ migrate to northern Gulf in spring ♦ migrate to eastern and western Gulf in fall ♦ oceanic waters < 80 m (262 ft)	♦ throughout range, May to October	♦ eggs ♦ larvae ♦ juveniles ♦ adults
SPANISH MACKEREL ♦ pelagic to depths of 75 m (246 ft) ♦ throughout coastal zone of GOM	♦ surface waters	♦ water column ♦ estuaries and coastal waters, year round ♦ most frequent offshore over intercontinental shelf waters ♦ water depths 9–84 m (30–276 ft) ♦ most common less than 50 m (164 ft)	♦ offshore, in beach surf ♦ occasionally in estuaries over clean sand	♦ neritic waters ♦ along coastal areas ♦ rare in estuaries, but in higher salinity estuarine areas during seasonal migrations	♦ offshore, May to October	♦ all life stages

Table H-3. EFH of Federally Managed Fish Species in the ROI (continued)

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
COBIA ♦ throughout coastal waters of GOM ♦ pelagic and epibenthic ♦ near wrecks, reefs, pilings, buoys, and floating objects ♦ occasionally enter estuaries ♦ shore to 20 m (66 ft) in eastern GOM ♦ shore to 40 m (131 ft) in northern GOM ♦ shore to 100 m (328 ft) in southern GOM	♦ surface waters ♦ pelagic, top meter of water column	♦ water column, May-September ♦ estuarine and offshore shelf waters of the northern GOM ♦ from the surface to depths of 300 m (984 ft)	♦ April to July in coastal waters and the offshore shelf in the northern GOM ♦ May-October in coastal waters and the offshore shelf ♦ same as adult areas ♦ includes coastal areas, bays and river mouths	♦ year round, throughout GOM ♦ seasonal migrations ♦ March-October in northern GOM ♦ November-March in southern GOM	♦ spring, summer, in northern GOM throughout all adult areas, except estuaries ♦ April-September in nearshore and shelf waters	♦ all life stages
DOLPHIN ♦ throughout GOM, oceanic waters ♦ occasionally coastal waters with ocean strength salinity ♦ coastal waters of northern GOM during summer months ♦ epipelagic, aggregates below floating objects, especially Sargassum	♦ surface waters	♦ water column ♦ over depths of greater than 50 m (164 ft) ♦ most abundant over 180 m (590 ft) ♦ nursery areas year round in oceanic and coastal waters with high salinity	♦ inshore and offshore ♦ associated with Sargassum communities	♦ over depths out to 1,800 m (5,904 ft) ♦ most common over the 40–200 m (131–656 ft) depth contour	♦ throughout adult areas of open GOM, year round ♦ peaks in spring and early fall	♦ all life stages7
BLUEFISH ♦ pelagic species, in many GOM estuaries ♦ on the outer continental shelf, to depths of 200 m (656 ft) ♦ most common along coasts of LA, MS, AL, FL	♦ surface waters	♦ water column ♦ inshore along beaches ● estuaries, inlets, and rivers	♦ inshore and offshore waters	♦ move north in spring and summer ♦ move south in fall and winter ♦ shallow waters up to 100 m (328 ft)	♦ generally along outer half of continental shelf ♦ April to November in northern GOM	♦ eggs ♦ adults

Table H-3. EFH of Federally Managed Fish Species in the ROI (continued)

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
LITTLE TUNNY ♦ distributed throughout the GOM ♦ usually depths less than 200–1,000 m (656–3,280 ft) ♦ pelagic ♦ most common in coastal areas with swift currents near shoals	♦ surface waters	♦ water column ♦ nursery areas-most coastal pelagic waters	♦ no data	♦ no data	♦ throughout species range, March through November	♦ all life stages
ATLANTIC BLUEFIN TUNA	♦ all waters from offshore Cape Canaveral at 28.25° N south around peninsular Florida to the U.S./Mexico border ♦ from 15 miles from shore to the EEZ boundary	● all waters from offshore Cape Canaveral at 28.25° N south around peninsular Florida to the U.S./Mexico border ● from 15 miles from shore to the EEZ boundary	● in the Florida Straits, from 27° N south around peninsular Florida to 81° W ● surface waters from the 200 m (656 ft) isobath to the EEZ boundary	♦ from offshore Terrebonne Parish, LA (90° W) to offshore Galveston, TX (95° W) ♦ from the 200 m (656 ft) isobath to the EEZ boundary	♦ all waters from offshore Cape Canaveral at 28.25° N south around peninsular Florida to the U.S./Mexico border ♦ from 15 miles from shore to the EEZ boundary	♦ eggs ♦ larvae ♦ spawning adults

Table H-3. EFH of Federally Managed Fish Species in the ROI (continued)

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
BONNETHEAD SHARK	♦ not applicable	♦ not applicable	neonate/early juveniles: ♦ in shallow waters on the Gulf side of the Florida Keys as far north as Cape Sable ♦ waters < 25 m (82 ft) ♦ shallow coastal bays and estuaries < 5 m (16 ft), from Apalachee Bay to St. Andrews Bay, FL late juveniles/sub-adults: ♦ shallow coastal waters, inlets and estuaries from Miami around peninsular Florida as far north as Cedar Key in ♦ waters < 25 m (82 ft) ♦ shallow coastal waters ♦ inlets and estuaries from the Mississippi River westward to the Rio Grande River (Texas/Mexico border)	♦ shallow waters around the Florida Keys ● shallow coastal waters from Mobile Bay, AL west to South Padre Island, TX ♦ 0–25 m (0–82 ft)	● no data	♦ juveniles ♦ adult

Table H-3. EFH of Federally Managed Fish Species in the ROI (continued)

Species and General EFH Description	Habitat Associations by Life Stage					EFH Life Stage Occurrence in the ROI
	Eggs	Larvae	Juvenile	Adults	Spawning Adults	
ATLANTIC SHARPNOSE SHARK	● not applicable	● not applicable	neonate/early juvenile: ♦ coastal areas including bays and estuaries ♦ out to the 25 m (82 ft) isobath ♦ Galveston Island south to the Rio Grande late juveniles/sub-adults: ♦ shallow coastal areas including bays and estuaries ♦ out to the 25 m (82 ft) isobath from Galveston Island south to the Rio Grande (Texas/Mexico border) ♦ off Louisiana from the Atchafalya River to Mississippi River Delta out to the 40 m (131 ft) isobath	♦ offshore St. Augustine, FL to Cape Canaveral, FL ♦ 0–100 m (0–328 ft) ♦ Mississippi Sound from Perdido Key to the Mississippi River Delta to the 50 m (164 ft) isobath ● coastal waters from Galveston to Laguna Madre, TX to the 50 m (164 ft) isobath	♦ no data	♦ juveniles

Source: GMFMC 1998 and NMFS 1999

Table H-4. Temperature Ranges and Associations of Fish and Shrimp Species with EFH in the ROI

Lifestage	Temperature Association
SHRIMP SPECIES	
Brown Shrimp	
Non-spawning adults (females > 140 mm total length [TL])	Survival is good between 50–98.6 °F in ponds; natural variability in temperature is less. Collected as low as 36 °F and as high as 90 °F; few collected below 50 °F; highest catches above 68 °F; temperatures 40 °F or below may cause narcosis and mortality.
Spawning adults	No data.
Fertilized eggs (0.26 mm diameter)	Eggs do not hatch below 75.2 °F.
Larvae and presettlement post-larvae; developmental stages include 5 nauplier, 3 protozoel, 3 mysis, and post-larval (< 14 mm) stage	Optimal temperature for larval development between 82.4–86.0 °F; no growth below 61 °F.
Late post-larvae and juveniles (after settlement; 14–80 mm)	Survival is good between 44.6–95.0 °F, this temperature tolerance decreases at low salinities; growth increases up about 86.0 °F; post-larvae burrow at low temperatures; catastrophic kills have occurred after cold fronts in shallow water; rapid change in temperature from 79 °F to 70 °F become inactive, convulsed, and develop muscular paralysis.
Sub-adults	Cold fronts with air temperatures between 64.4–71.6 °F have been documented to cause mass mortality.
White Shrimp	
Non-spawning adults (females ≥ 165 mm TL; males ≥ 119 mm TL)	Tolerant of temperatures between 44.6–95.0 °F; 50% mortality at 46.4 °F; 100 percent mortality at or below 37.4 °F; more tolerant of high temperatures, less tolerant of low.
Spawning adults	Sudden temperature increases trigger spawning and rapid deceases in temperature associated with end of spawning.
Fertilized eggs (0.28 and 0.192–0.3 mm diameter)	No data.
Larvae and pre-settlement post-larvae; developmental stages include 5 nauplier, 3 protozoel, 3 mysis, and post-larval (<8 mm) stage (0.3–8 mm) (Muncy 1984)	*Penaeus* nauplier stages occurred in offshore waters 62.6–83.3 °F.
Late post-larvae and juveniles (after settlement; 8–90 mm)	Post larvae collected 55.4–87.8 °F; juveniles collected between 48.2 91.4 °F, and most abundant 59.0–91.4 °F. In laboratory juveniles grow and survive at constant 95 °F; catastrophic kills have occurred in shallow water after cold fronts.
Sub-adults	Cold fronts can cause mass mortality in South Carolina, survival requires minimum temperature of > 42.8 °F.

Table H-4. Temperature Ranges and Associations of Fish and Shrimp Species with EFH in the ROI (continued)

Lifestage	Temperature Association
FISH SPECIES	
Red Drum	
Eggs (0.80–0.98 mm)	68.0–86.0 °F; 77.0 °F optimal.
Larvae (4–6 mm)	77.0 °F optimal; 64.9–87.8 °F.
Post-larvae (7 mm)	77.0 °F optimal; up to 86 °F; 64.9–87.8 °F.
Early juvenile	54.5–90 °F; can survive from 36–91°F if change in temperature is gradual; prefer 50–86 °F.
Juvenile (15–300 mm)	Temperatures within the upper 10–13 m range from 80.6–84.2 °F in August and September; 75.2–78.8 °F in October; 71.6–73.4 °F in early November; prefer 50–86 °F. Upper 33–43ft range from 81–84 °F in August through October 75–79 °F and in early November 72–73 °F
Adult (305–750 mm)	Observed in 35.6–91.4 °F. Moves into deep water when extreme temperatures occur.
Spawning adults	Occurs from 68.0–86.0 °F; may continue spawning for 90 days or more.
Red Grouper	
Eggs	Hatch in 30h at 75.2 °F
Larvae	Optimum report at 81.3–83.8 °F
Early juveniles (benthic)	60.9–88.2 °F
Adults	59–86 °F; most common at 66–77 °F
Early Juveniles	54.5–90 °F; 35.6–91.4 °F if change in temperature is gradual; 35.6–94.8 °F; prefer 50.0–86 °F.
Late Juveniles	Temperatures within the upper 10–13 m range from 80.6–84.2 °F in August and September; 75.2–78.8 °F in October; 71.6–73.4 °F in early November; prefer 50–86 °F.
Adults	Observed in 35.6–91.4 °F. Moves into deep water when extreme temperatures occur.
Spawning Adults	Occurs from 68.0–86.0 °F; may continue spawning for 90 days or more.
Red Snapper	
Eggs (0.77–0.85 mm)	No data.
Larvae (2.2 mm)	Taken at temperatures ranging from 63.1–85.5 °F.
Post-larvae	Taken at temperatures ranging from 63.1–85.5 °F.
Early juveniles (4 mm)	Taken at temperatures ranging from 63.1–85.5 °F.
Late juveniles (22 mm)	No data.
Adults	Taken from area with bottom temperatures ranging from 57.2–86.0 °F. Lower tolerance level 55 °F and upper tolerance level 92 °F.
Spawning adults	Spawned in water ranging from 73–77 °F.

Table H-4. Temperature Ranges and Associations of Fish and Shrimp Species with EFH in the ROI (continued)

Lifestage	Temperature Association
Gray Snapper	
Eggs (0.4–0.6 mm)	No data.
Larvae (transforms to juveniles between 6.3–9.6 mm)	Occurs in temperatures ranging from 60–81 °F.
Post-larvae	No data.
Adults	Occur in water temperatures from 56.1–90.5 °F. Lower lethal limit range between 51.8–57.2 °F.
Tilefish	
Eggs	Usually hatch in 40 h at 71.6–76.3 °F in lab
Larvae	No data
Juveniles	No data
Adults	Usually found at 48–58 °F
Spawning Adults	No data
Greater Amberjack	
Eggs	No data.
Larvae	Most likely warm, summer temperatures.
Post-larvae	No data.
Juveniles	No data.
Adults	Become more scarce in the northern GOM under 64.4–68.0 °F in fall.
Spawning adults	No data.
Lesser Amberjack	
Eggs	No data.
Larvae	No data.
Post-larvae	No data.
Juveniles	No data.
Adults	No data.
Spawning adults	Appears to be a cessation of spawning during coldest month (December-January) in the northern GOM.
Gray Triggerfish	
All life stages	No data.
King Mackerel (endothermic)	
Eggs	Hatch in 18–21 h at 81°F.
Larvae (2.0–2.9 mm SL)	68–88 °F.
Early juveniles	No data.
Late juveniles	No data.
Adults	The temperature considered the main trigger for seasonal migration is 68.0 °F.
Spawning adults	68.0 °F.

Table H-4. Temperature Ranges and Associations of Fish and Shrimp Species with EFH in the ROI (continued)

Lifestage	Temperature Association
Spanish Mackerel	
Eggs	Hatch in 25h at 78.8 °F.
Larvae	Collected at 68.0–89.6 °F.
Early juveniles	Most collected at 77.0 °F.
Late juveniles	No data.
Adults	68.0 °F; usually taken at 69.8–98.6 °F.
Spawning adults	77.0 °F.
Cobia	
Eggs fertilized (1.2–1.5 mm diameter; pelagic)	Highest hatchery rates (lab); 82.6–85.5 °F.
Larvae (2.0–2.6 mm SL)	75.6–89.6 °F; high is 98.1 °F.
Pre-juvenile (20–25 mm SL)	78.6–86.5 °F; 67.3–77.4 °F; > 86 °F.
Early juvenile	62.2–77.4 °F.
Late juvenile	No data.
Adult	73.4–82.4 °F; 67.3–77.4 °F (southern Atlantic).
Spawning adult	73.4–82.4 F.
Dolphin	
Eggs	Hatch in 40 hr at 79 °F; 38 hr at 77 °F.
Larvae	Most abundant at 75 °F and above; reared at 77–84 °F in hatchery.
Early juveniles	78.8–84.2 °F (culture experiments).
Late juveniles	No data.
Adults	68 °F isotherm considered northern distributional limit; more numerous at 77–79 °F.
Spawning Adults	Usually at > 75 °F; successfully spawned at 75–84 °F in culture experiments.
Bluefish	
Eggs	Occur in the wild from 64.4–79.3 °F.
Larvae	Collected in northern GOM at a mean temp of 76.3 °F with a range of 72.3–80.4 °F.
Adults	Range between 64.4 °F and 69.8 °F but can survive temperatures as low as 45.5 °F temporarily. Have been recorded in temps ranging from 58.6 °F to 88.2 °F.
Spawning adults	Optimal temperature for spawning in GOM is 78.1 °F.
Little Tunny	
All life stages	No data.
Atlantic Bluefin Tuna	
Life stage no specified	Constrained by 54.0 °F isotherm; individuals can dive to 43.0–46.0 °F to feed.

Table H-4. Temperature Ranges and Associations of Fish and Shrimp Species with EFH in the ROI (continued)

Lifestage	Temperature Association
Bonnethead Shark	
Age One	Found in temperatures of 61.0–88.7 °F.
Atlantic Sharpnose Shark	
Nenoates (newborns)	Found in temperatures 75.2–87.3 °F.
Larger juveniles	Found in temperatures of 63.0–91.9 °F.

Source: Adapted from NMFS 1999 and GMFMC 2003

Table H-5. Summary of the Proposed Action Impacts on EFH

Proposed Action Component/ Impact	EFH Type			
	Water Column	Sediments	Shoals and Topographic Relief	Sargassum
Placement of Terminal	▪ temporary increase in turbidity-not significant	▪ displacement of sediments-not significant ▪ secondary impact on prey species-not significant	▪ no expected impact	▪ no expected impact
Pipeline Installation	▪ temporary increase in turbidity-not significant	▪ displacement of sediments-not significant ▪ secondary impact on prey species-not significant	▪ minor adverse impacts	▪ no expected impact
LNG Vaporization-Intake	▪ impingement/ entrainment-localized impact reduced to insignificant through utilization of best available technology	▪ no expected impact	▪ no expected impact	▪ no expected impact
LNG Vaporization-Discharge	▪ 7.8 °F decrease in water temperature - not significant ▪ potential increase in turbidity - not significant	▪ displacement of sediments-not significant	▪ no expected impact	▪ no expected impact
Treated Water Discharge	▪ impact on water quality - not significant	▪ impact on sediment quality-not significant	▪ no expected impact	▪ no expected impact
Vessel and Aircraft Noise	▪ no expected impacts	▪ no expected impact	▪ no expected impact	▪ no expected impact
Terminal Lighting	▪ might attract ichthyoplankton - not significant	▪ no expected impact	▪ no expected impact	▪ no expected impact

Table H-5. Summary of the Proposed Action Impacts on EFH (continued)

Proposed Action Component/ Impact	EFH Type			
	Water Column	**Sediments**	**Shoals and Topographic Relief**	***Sargassum***
Presence of Terminal	▪ would provide artificial reef for colonization-positive impact ▪ proposed Safety Zone would provide refuge from fishing-positive impact	▪ displacement of sediments-not significant ▪ would provide artificial reef for colonization-positive impact ▪ proposed Safety Zone would provide refuge from fishing-positive impact	▪ would provide artificial reef for colonization-positive impact ▪ proposed Safety Zone would provide refuge from fishing-positive impact	▪ no expected impact
Increased Vessel Traffic	▪ no expected impact	▪ no expected impact	▪ no expected impact	▪ no expected impact
Marine Debris	▪ no expected impact	▪ no expected impact	▪ no expected impact	▪ no expected impact
Accidental Release	▪ Minor release o no expected impact ▪ Unlikely, catastrophic release o freezing of tissue-localized significant, short-term impact	▪ Minor release o no expected impact ▪ Unlikely, catastrophic release o no expected impact	▪ Minor release o no expected impact ▪ Unlikely, catastrophic release ▪ no expected impact	▪ Minor release o no expected impact ▪ Unlikely, catastrophic release o no expected impact
Decommissioning	▪ If explosives need to be used to remove platforms o increase in turbidity-not significant o direct physical damage from explosion-not significant o noise impact-not significant	▪ If explosives need to be used to remove platforms o increase in turbidity-not significant o direct physical damage from explosion-not significant	▪ If explosives need to be used to remove platforms o increase in turbidity-not significant o direct physical damage from explosion-not significant	▪ If explosives need to be used to remove platforms o increase in turbidity-not significant o direct physical damage from explosion-not significant